A Short History of USW Open Architecture

and

Small Business Perspectives on The Open Business Model

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12 November 2013

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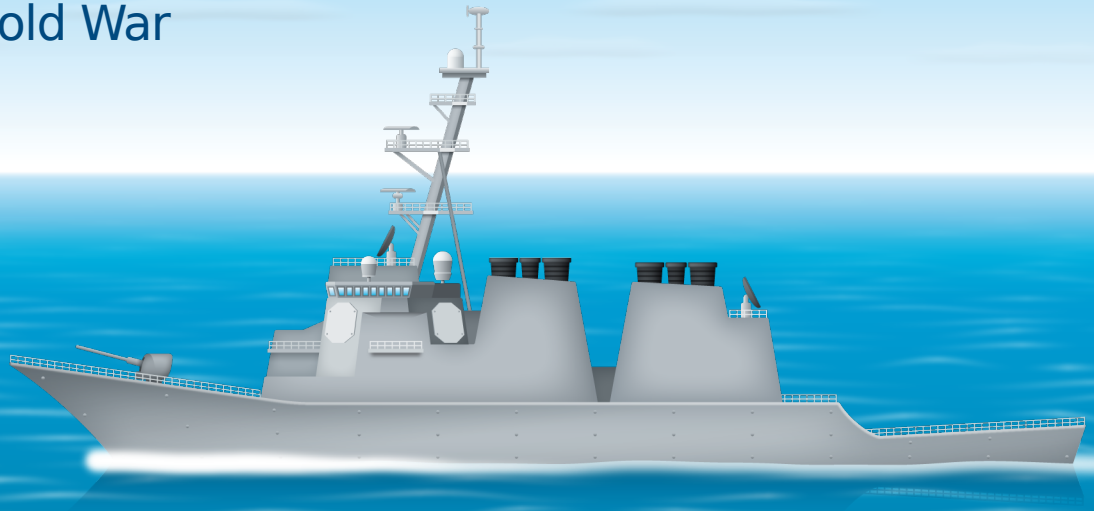
Prehistoric Systems Acquisition (circa 1987)

- In 1987, I graduated from the University of Rochester – and joined NAVSEA
  as an Engineer In Training
- I worked in NAVSEA 63D – the Advanced Systems and Technology Office
- In the Surface Ship Anti-Submarine Warfare Branch – in the heat of the Cold War



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- In the Surface Ship Anti-Submarine Warfare Branch – in the heat of the Cold War
  - We spent $30 - $60/M per year of 6.3 Dollars
  - CNOs Urgent ASW Response Program (CUARP)

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Prehistoric Systems Acquisition (circa 1987)

- R&D focused on
  - Active Sonar
  - Passive Sonar
  - Target Motion Analysis
  - Advanced Targeting and Weapons Management
  - Data Fusion
  - Transducers and Towed Arrays
  - Displays and Controls

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Prehistoric Systems Acquisition (circa 1987)

- After about 4 years – I moved 4 cubicles over to work on Submarine ASW Advanced Development

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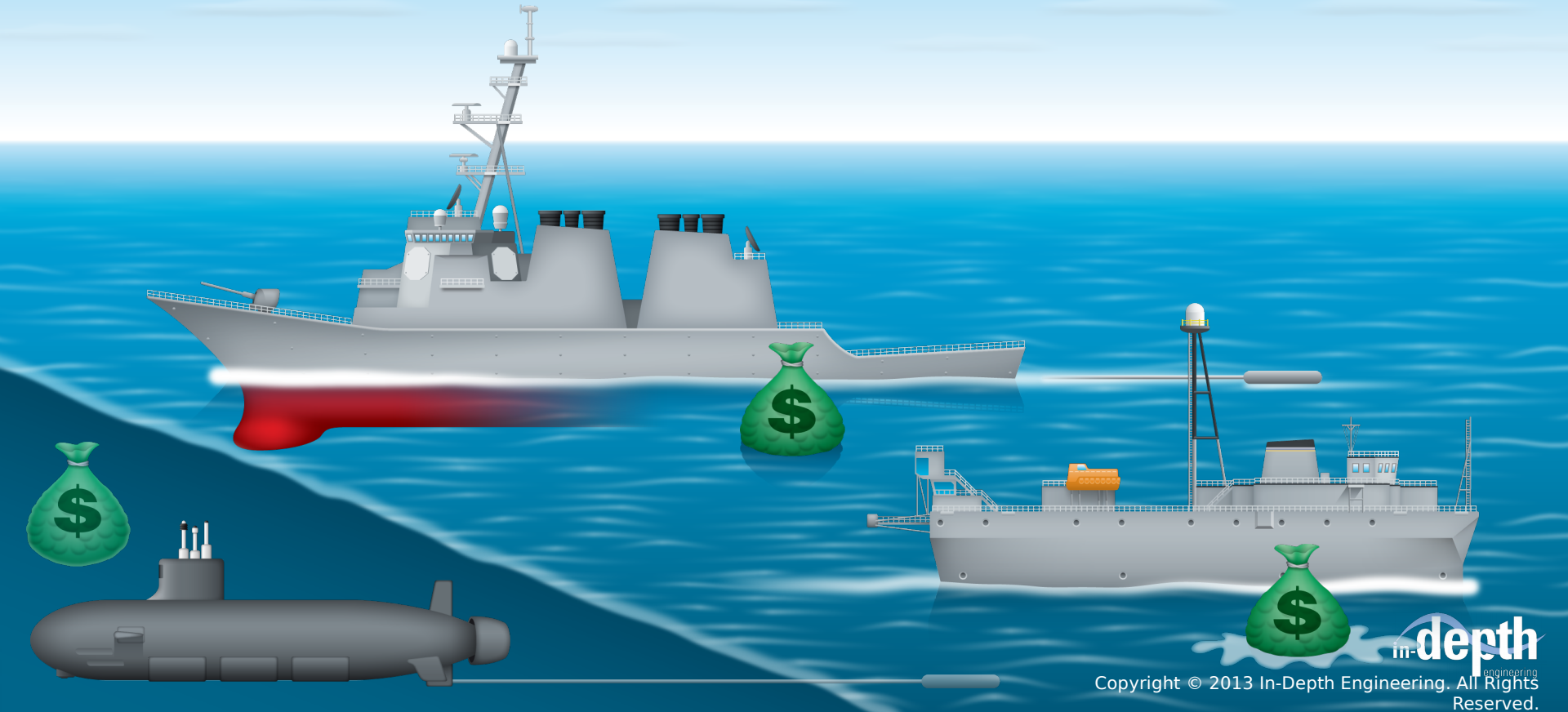
Prehistoric Systems Acquisition (circa 1987)

- Across the street lived SPAWAR
- They ran the Fixed Distributed System and SURTASS Programs



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Prehistoric Systems Acquisition (circa 1987)

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  - Active Sonar
  - Passive Sonar
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Prehistoric Systems Acquisition (circa 1987)

- Each R&D program was coupled with a production program
  - Provided complete custom (no COTS in that era) solution
  - AN/SQQ-89
  - AN/BSY-1/2
  - IUSS
- “ We don’t need any of that surface ship stuff on our submarine”

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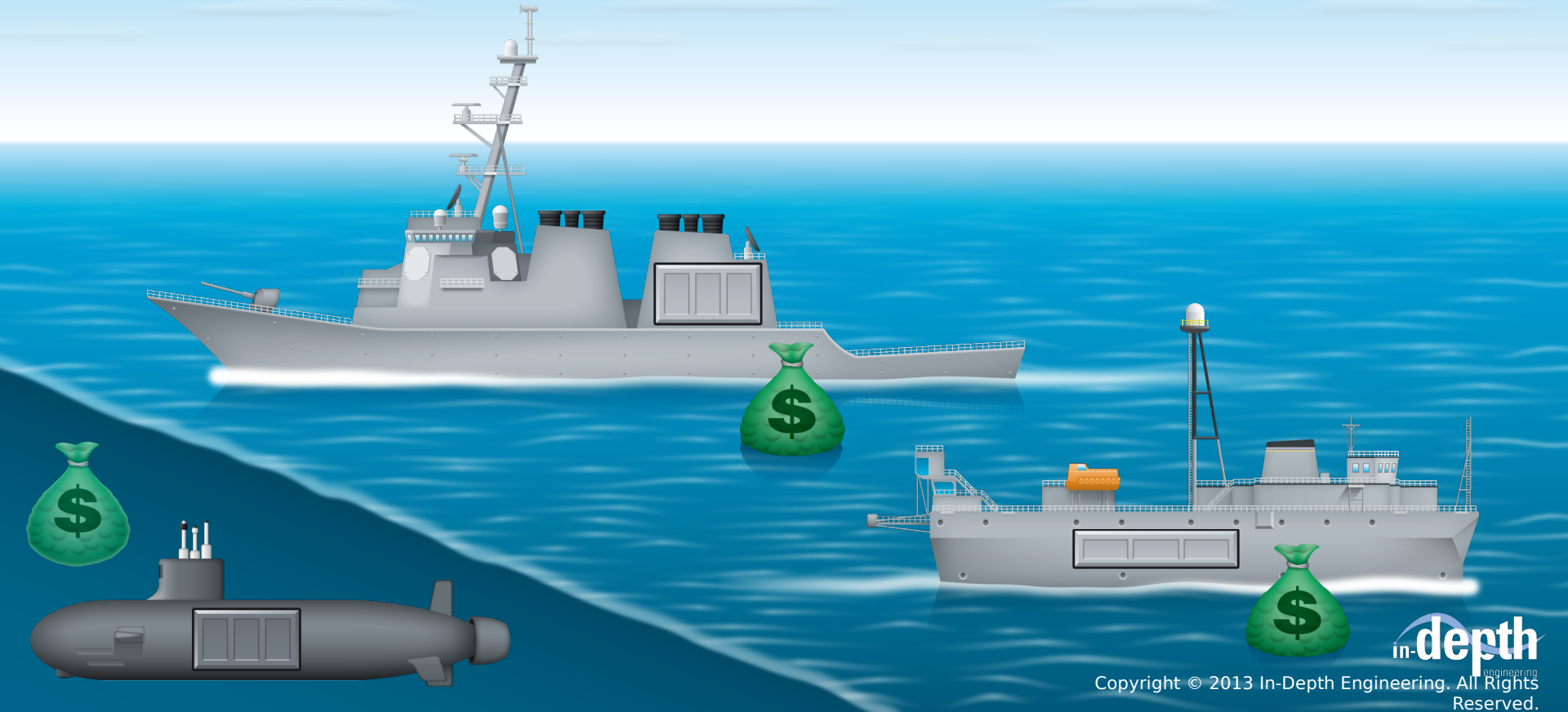
The World Changed

- Then the cold war ended…
- Then the budget got cut… by a lot…
- The dawn of the Commercial Electronics Industry (COTS)



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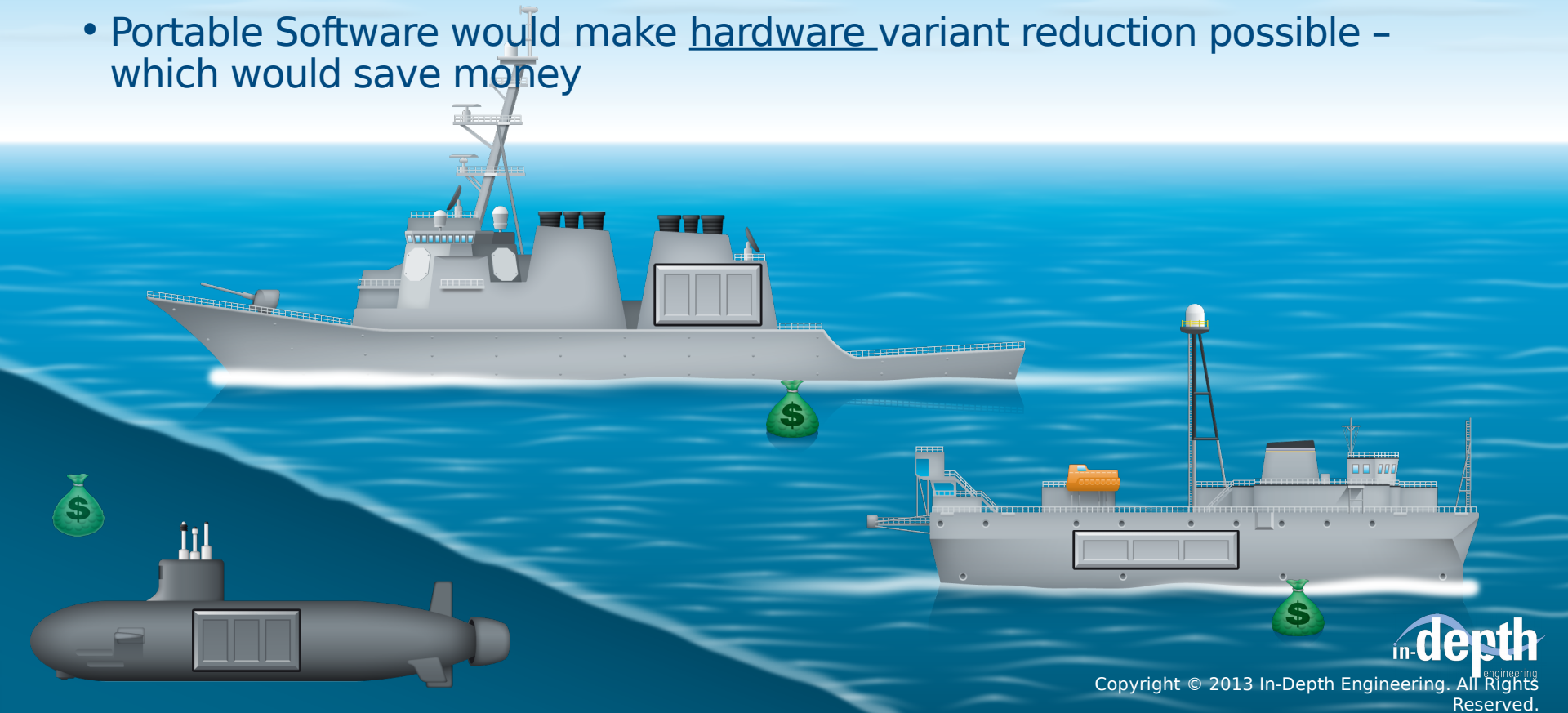
USW Open Architecture

- A few brave souls put forward the notion of USW commonality in a Open Architecture
- Commonality would allow a product line approach to applications
  - Concentration of resources – to save money
  - A best-of-the-best process
- Portable Software would make hardware variant reduction possible – which would save money



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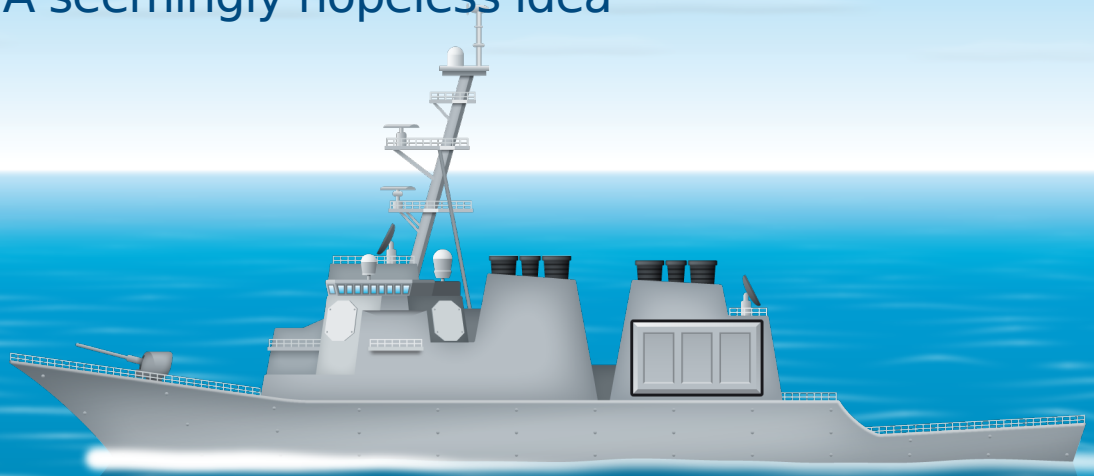
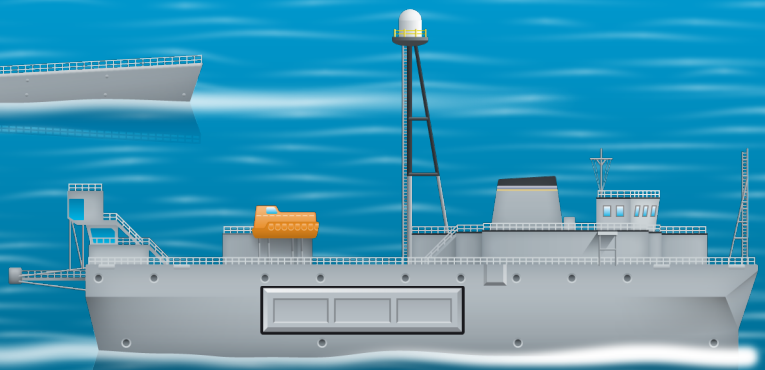
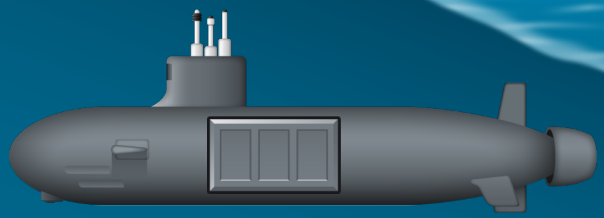
Commonality

- Commonality was difficult – and widely disliked
  - Contrary to existing contract arrangements
  - Contrary to the way money is appropriated
  - Contrary to organization charts at NAVSEA and OPNAV
  - A seemingly hopeless idea







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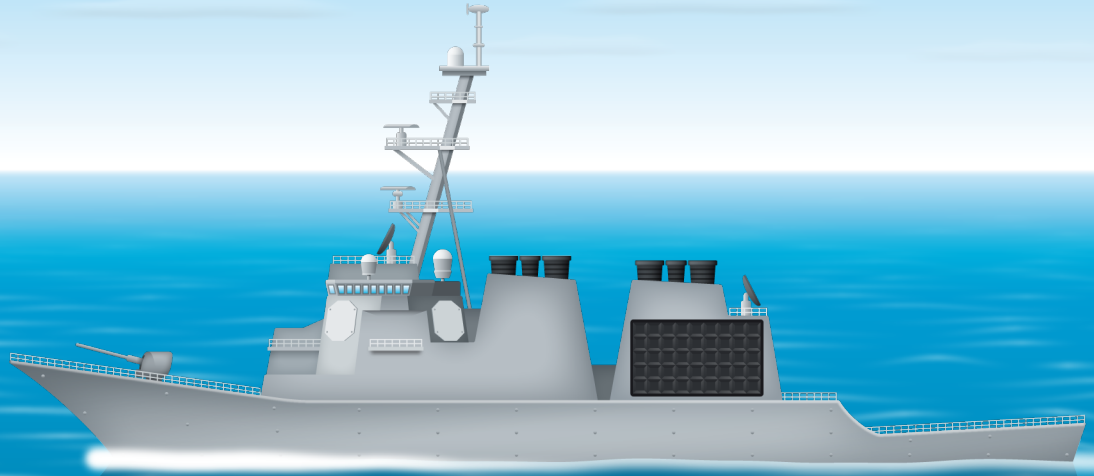
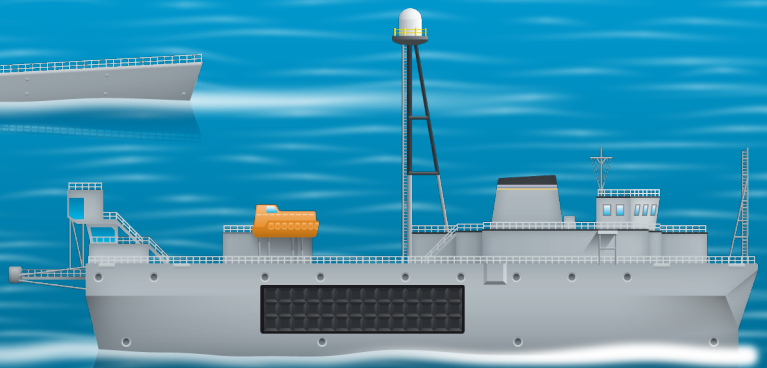
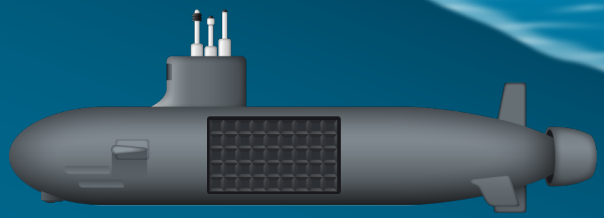
The Technology Blueprint

- We decided to define a Technology Blueprint
  - Modular System Approach
  - Defined Interfaces
  - Interoperable







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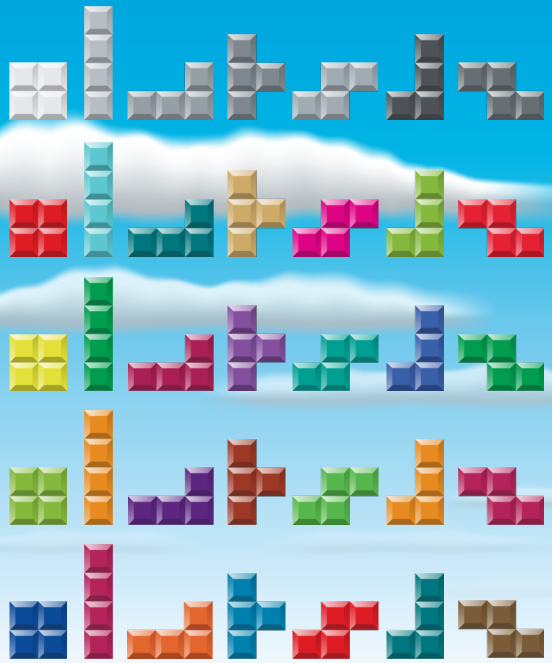
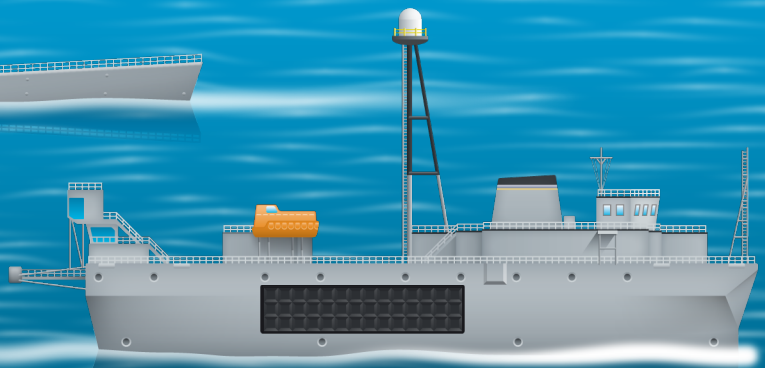
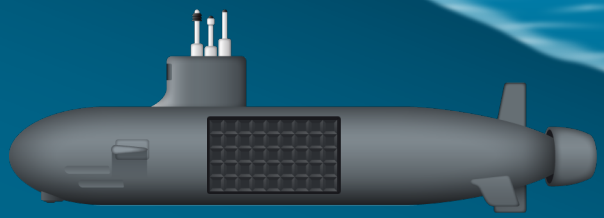
The Technology Blueprint

- We decided to define a Technology Blueprint
  - Modular System Approach
  - Defined Interfaces
  - Interoperable
- A community of scientists and small business were energized by this effort







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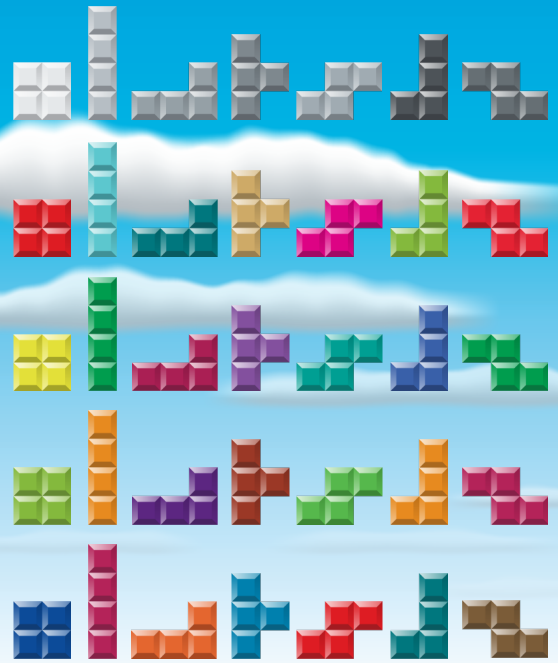
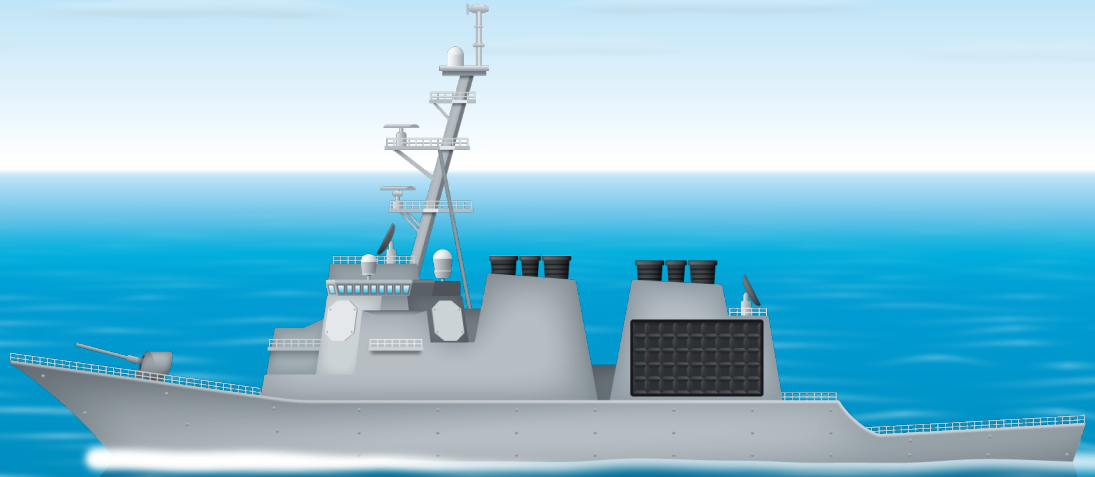
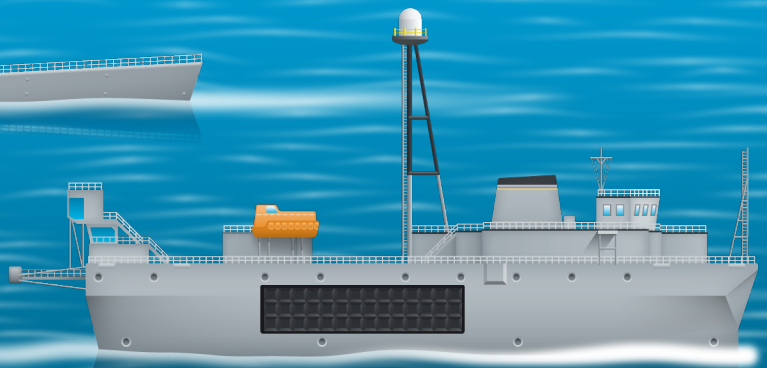
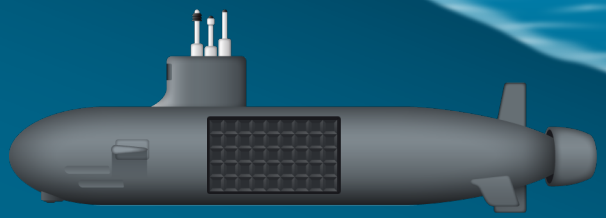
Redundant Capability

- We quickly noticed functional redundancy across product lines – as all the communities had similar applications









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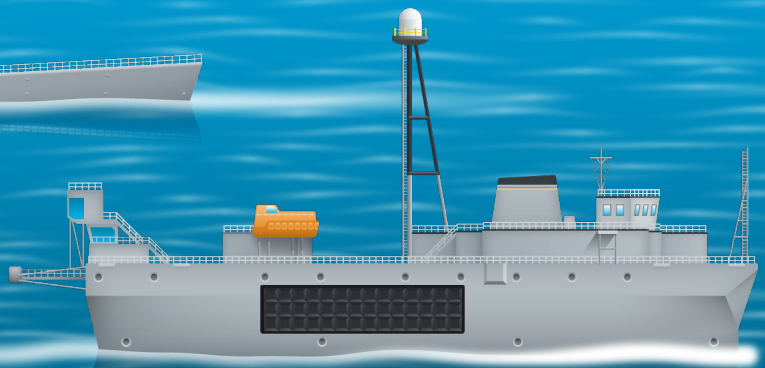
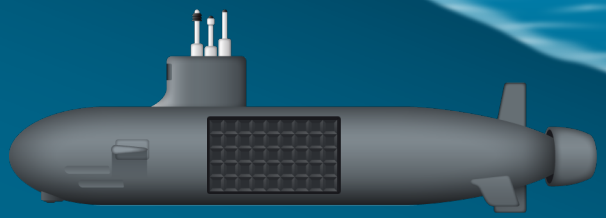
Redundant Capability

- We quickly noticed functional redundancy across product lines – as all the communities has similar applications
- We decided to conduct a shoot-off…using real data
  - Measurements Program





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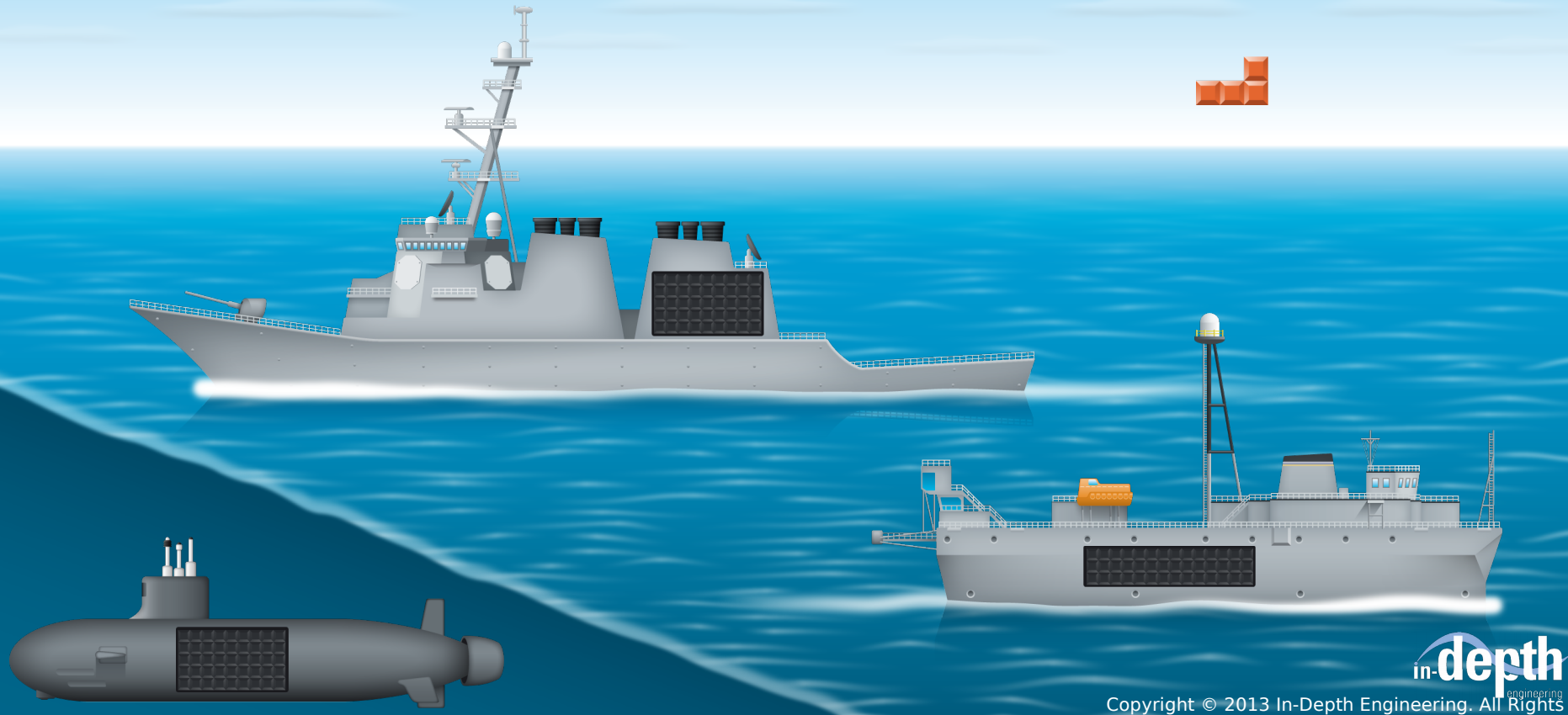
A Common Baseline Components

- The Common Pieces that remained formed the basis for USW commonality



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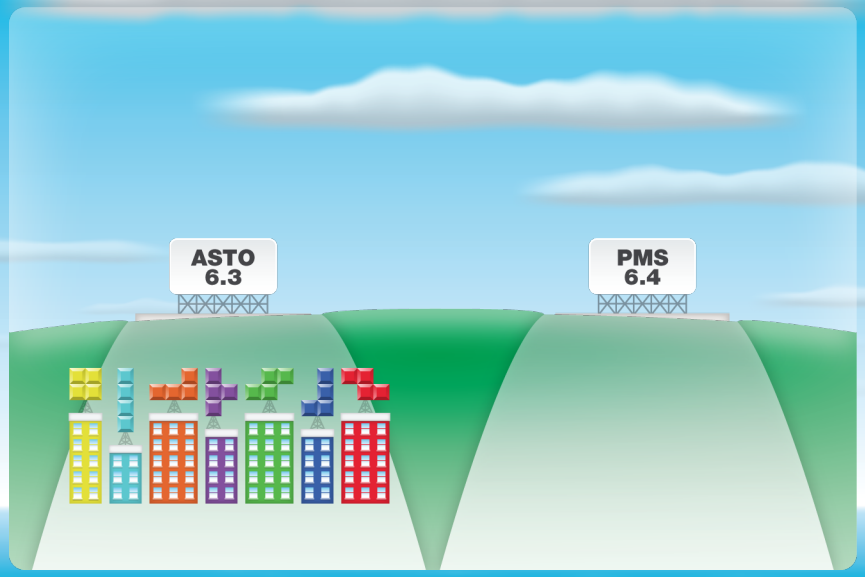
Competition and the 4-Step Process

- We instituted an annual competition using Broad Agency Announcement
  - Driven by Fleet Requirements Letter
  - Compete for upgrade or replacement of each piece
  - “Bring me your best ideas”
  - Instituted a 4-Step process



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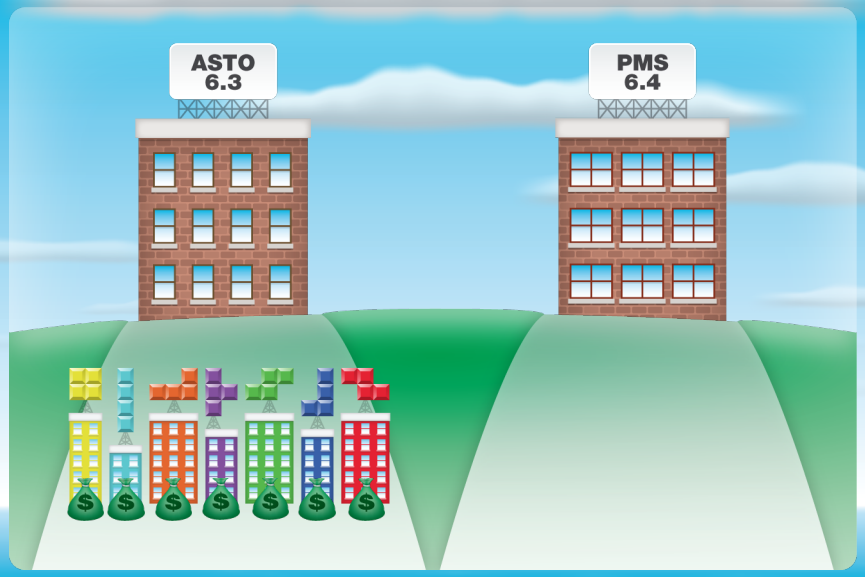
Competition and the 4-Step Process

- Competition for ‘Tetris pieces’ in the BAA changed the competitive market space
- For the FIRST TIME small businesses could bid for and win the right to build pieces of a large combat system
  - Navy able to harvest innovation
  - Execute at low cost



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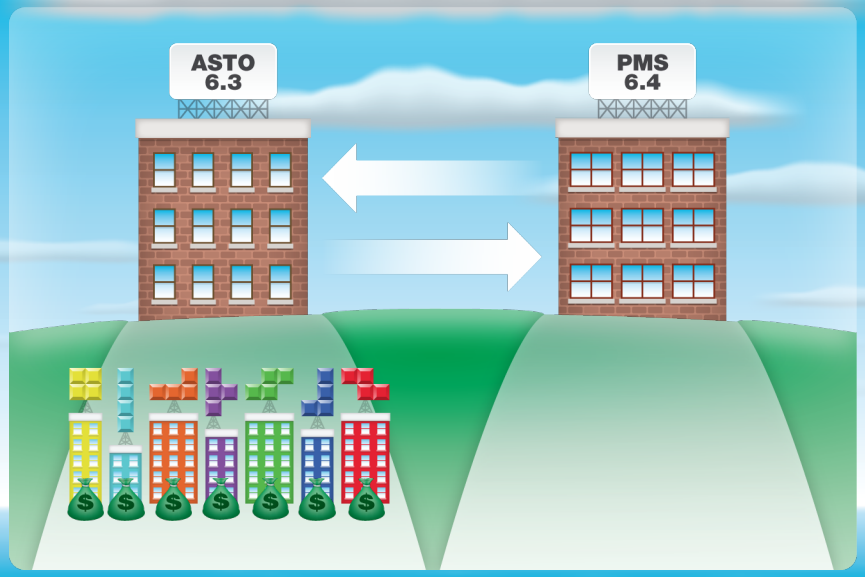
A New Contracting Model in Production

- Concurrent changes occurred in the production program offices



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- Concurrent changes occurred in the production program offices
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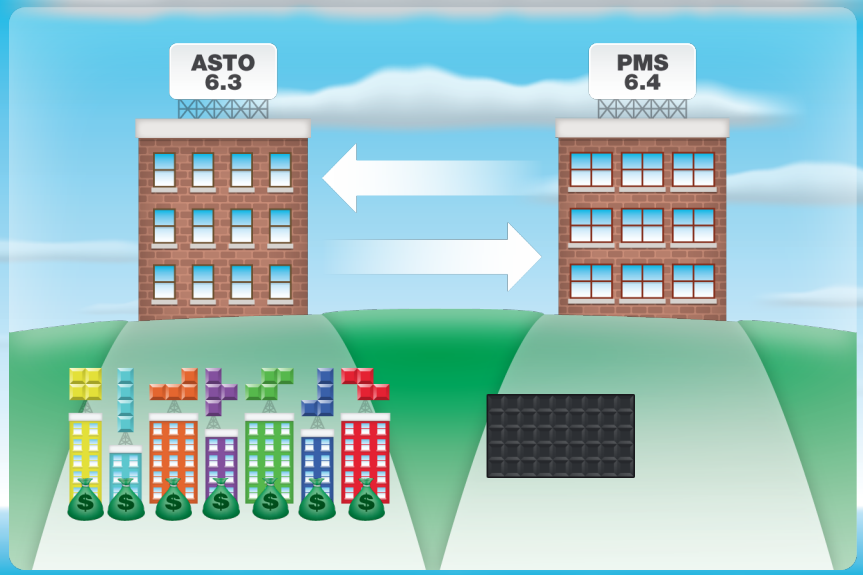

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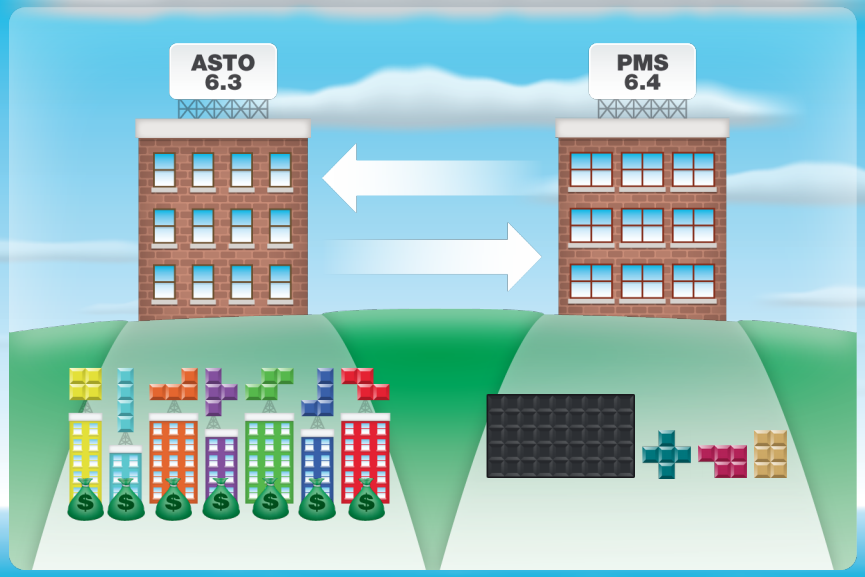
  - Some unique platform-specific pieces remained



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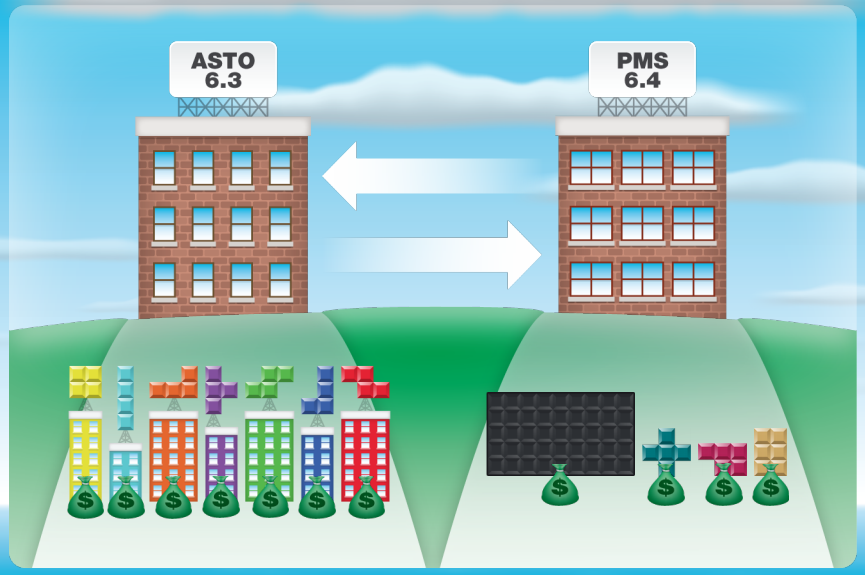
A New Contracting Model in Production

- Concurrent changes occurred in the production program offices
  - Roll of Integrator replaced previous notion of Prime Contractor
  - Some unique platform-specific pieces remained
  - Government assumed GFE/GFI Risk
    - …but the Government always held the developmental risk



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Intellectual Property Rights

"…any man might instantly use what another had invented; so that the inventor had no special advantage from his own invention…[intellectual property law]… secured to the inventor, for a limited time, the exclusive use of his invention; and thereby added the fuel of interest to the fire of genius, in the discovery and production of new and useful things."

– Abraham Lincoln , February 11, 1859

- The new 4-step process was all about fueling the fire of genius

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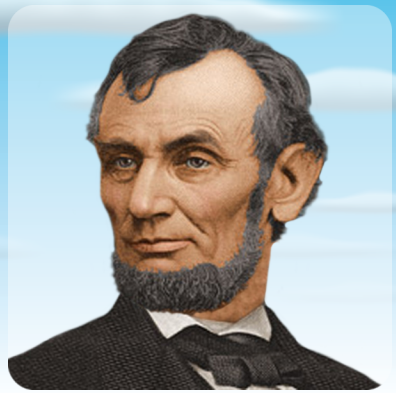
Intellectual Property Rights

- We used DFAR Intellectual Property Clauses in all our contracts
  - IP rights assigned according to investment source
  - Product line developer retains title and ©; Government gets GPR



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Intellectual Property Rights

- We realized that “It is in the Government’s best interest to maintain broad interest in contributions to innovation by protecting IP”
- We realized that *bring me your best every year* “consumed the fire”
- “Government endeavors to keep the Developer engaged in the integration, test and any future changes to the product”

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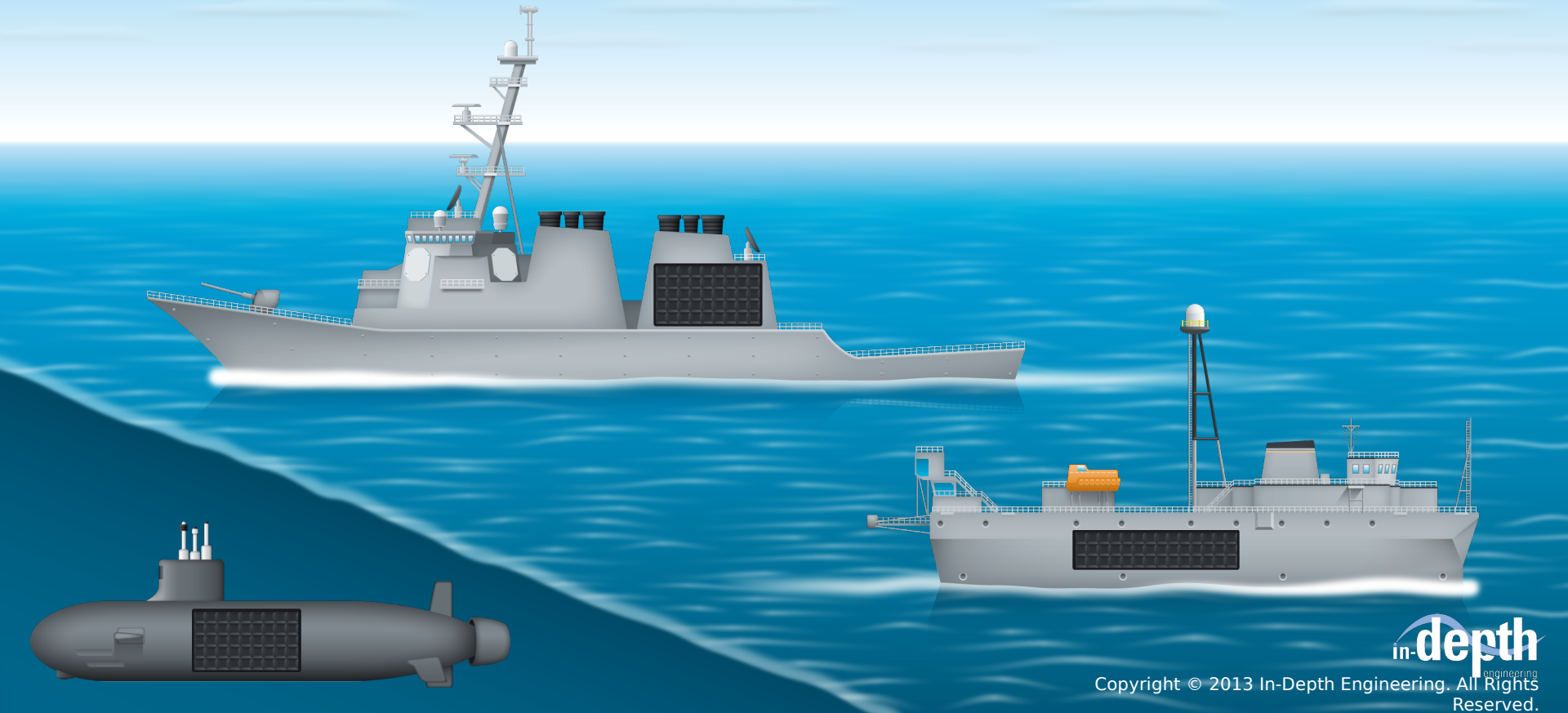
Intellectual Property Rights

- This culture defines the Open Business Model



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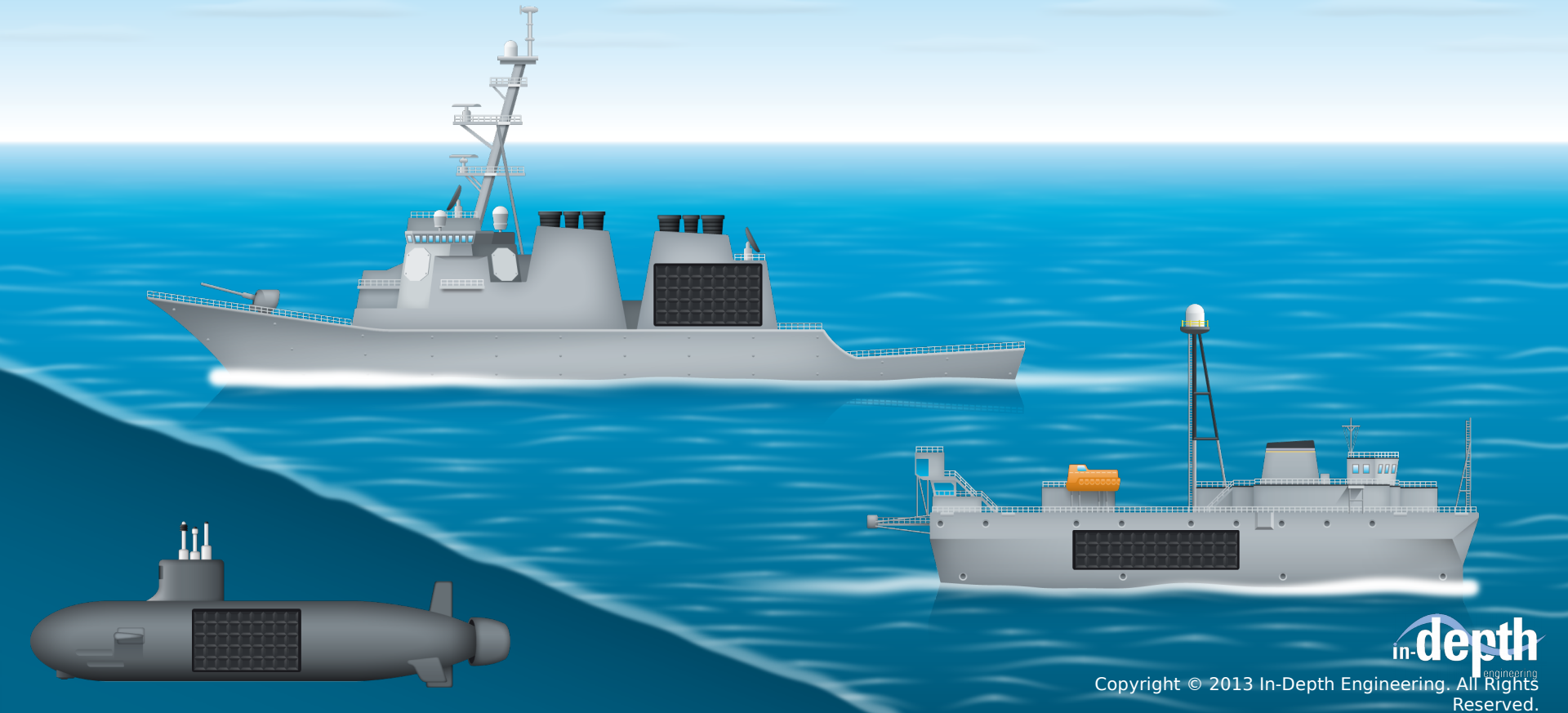
History changed again…

- I left NAVSEA in 2002 – to join DHS –
  and then joined private industry – In-Depth Engineering
- I watched the process play out from here



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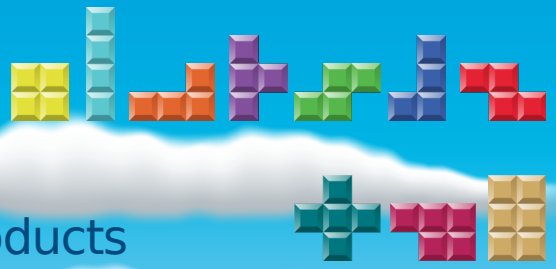
A Common Baseline – Circa. 2005



- Production Programs successfully integrated 6.3 Products
  - Active thread
  - Passive thread
  - Target Motion Analysis
  - Data Fusion
  - Fire Control
  - Displays and Controls

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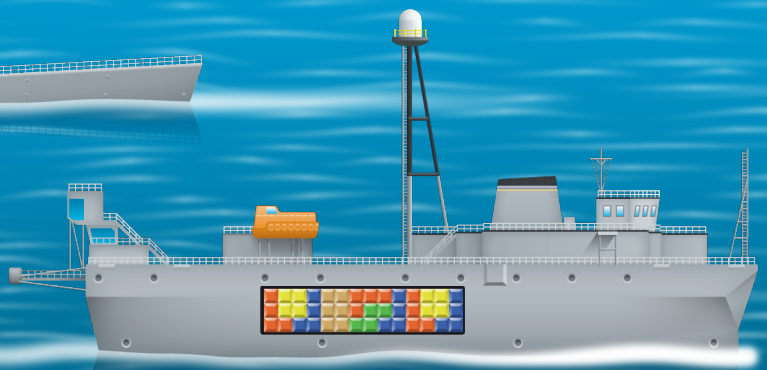
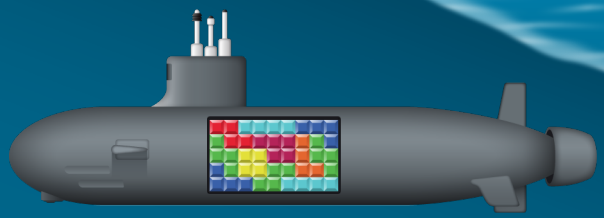
A Common Baseline – Circa. 2005

- Production Programs successfully integrated 6.3 Products
  - Active thread
  - Passive thread
  - Target Motion Analysis
  - Data Fusion
  - Fire Control
  - Displays and Controls
  - Each Platform has unique functions and capabilities





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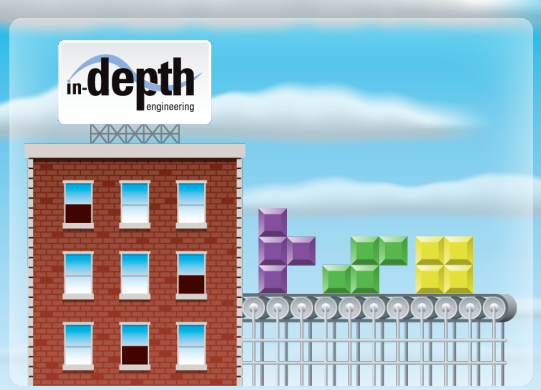
- We’re pleased to build Tetris pieces
  - Target Motion Analysis
  - Data Fusion
  - Fire Control
  - Displays and Controls



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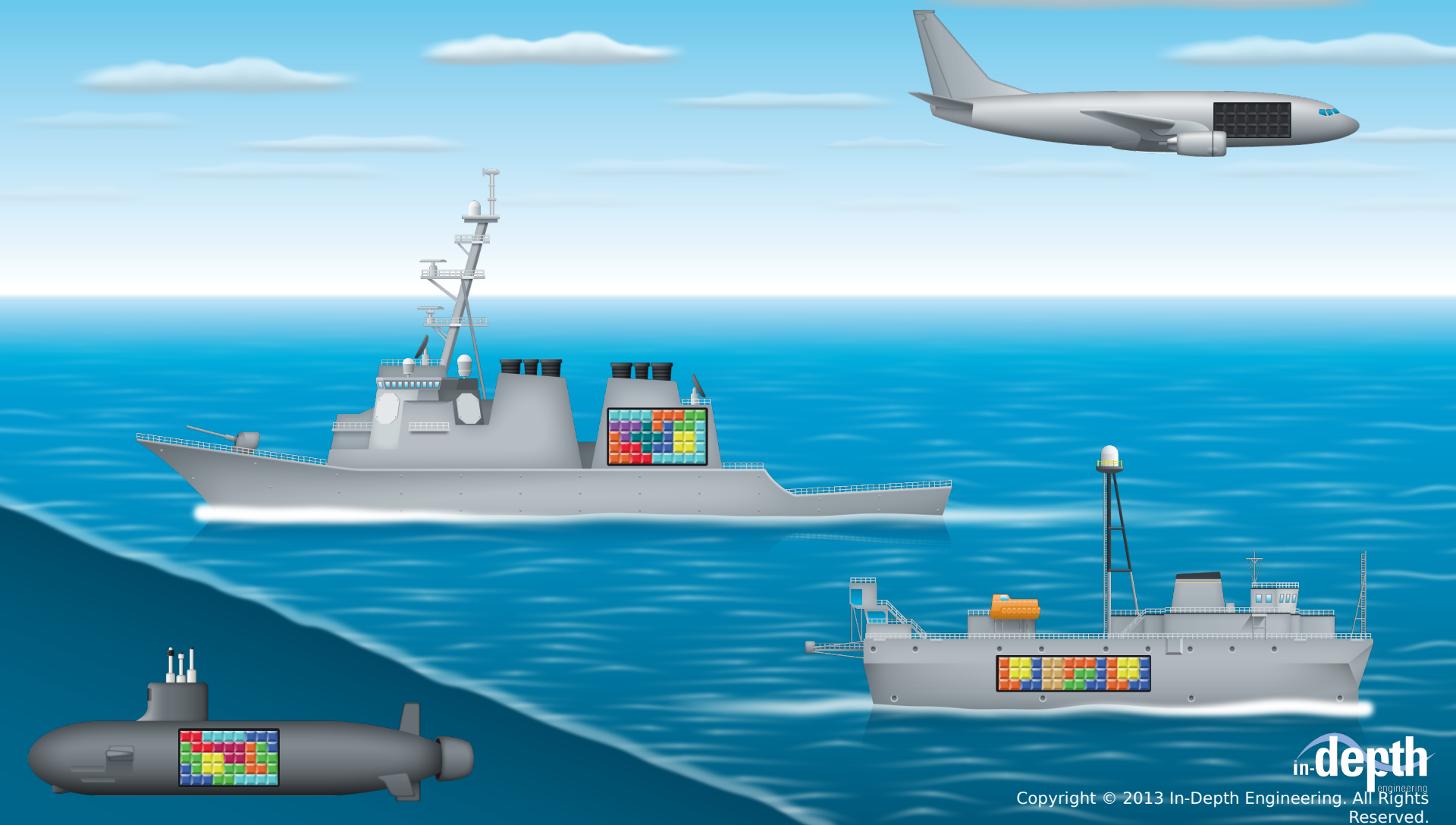
We’re excited about the future of OA

- The P-8A Increment 3 moves toward an Open System



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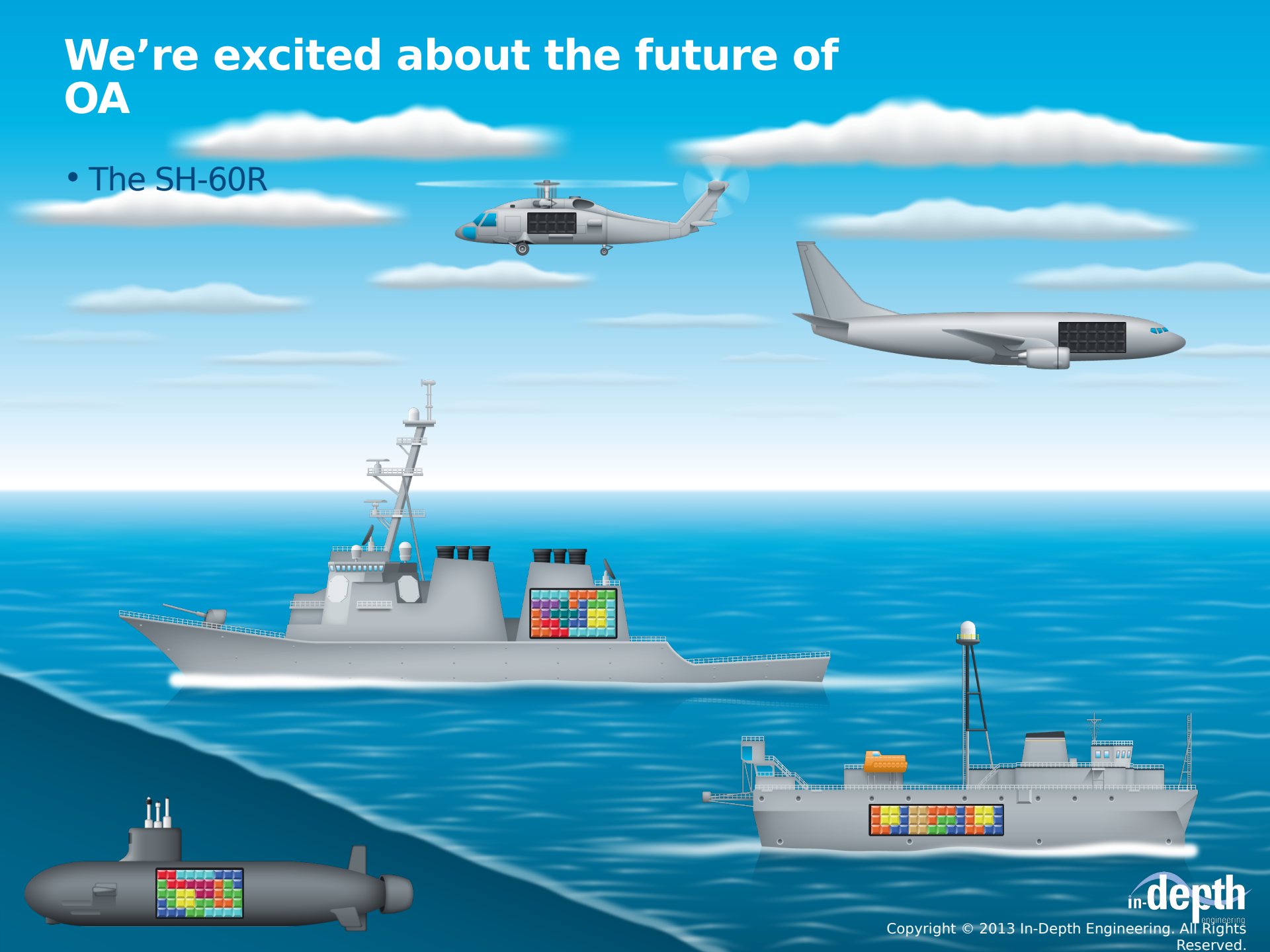
We’re excited about the future of OA

- The SH-60R



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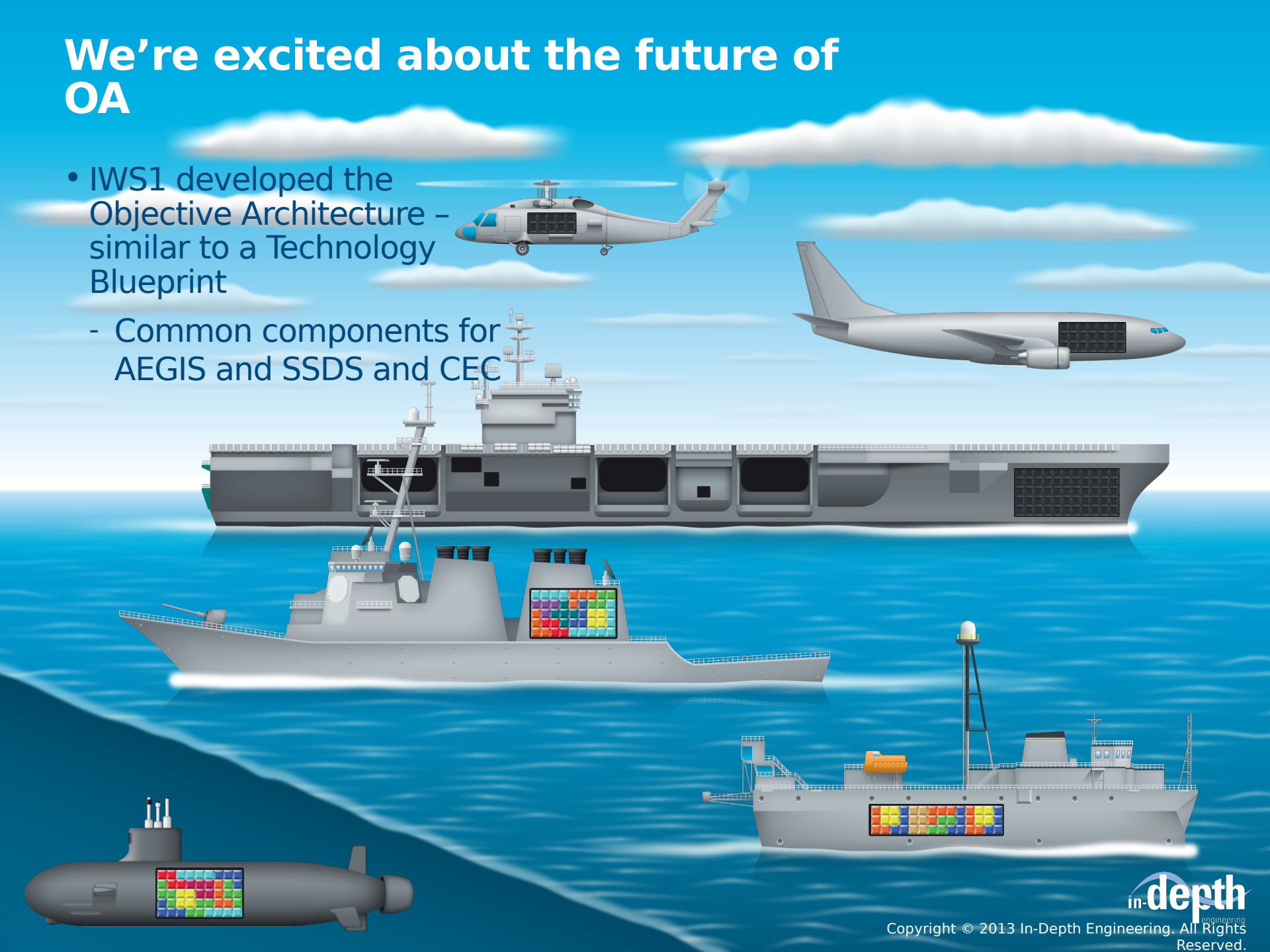
We’re excited about the future of OA

- IWS1 developed the Objective Architecture – similar to a Technology Blueprint
  - Common components for AEGIS and SSDS and CEC



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DOD Level Commonality is Possible

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DOD Level Commonality Is a Logical Response to Budget Reductions

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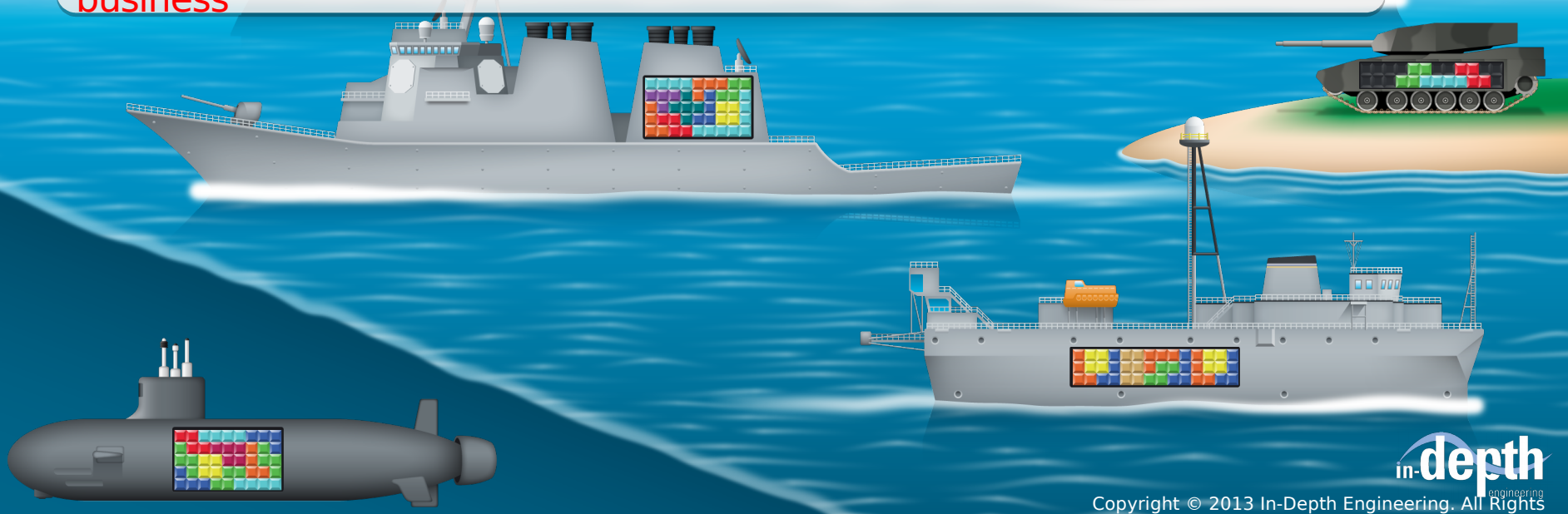
Summary

- The Open Business Model is
  - Technology Blueprint
  - Commitment to a Measurements Program – to pick Best of the Best
  - Ongoing competition at the component level
  - Separable product line funding and contracting
  - Taking Intellectual Property *Protection* Seriously

The Open Business Model is good for the Navy and good for small business



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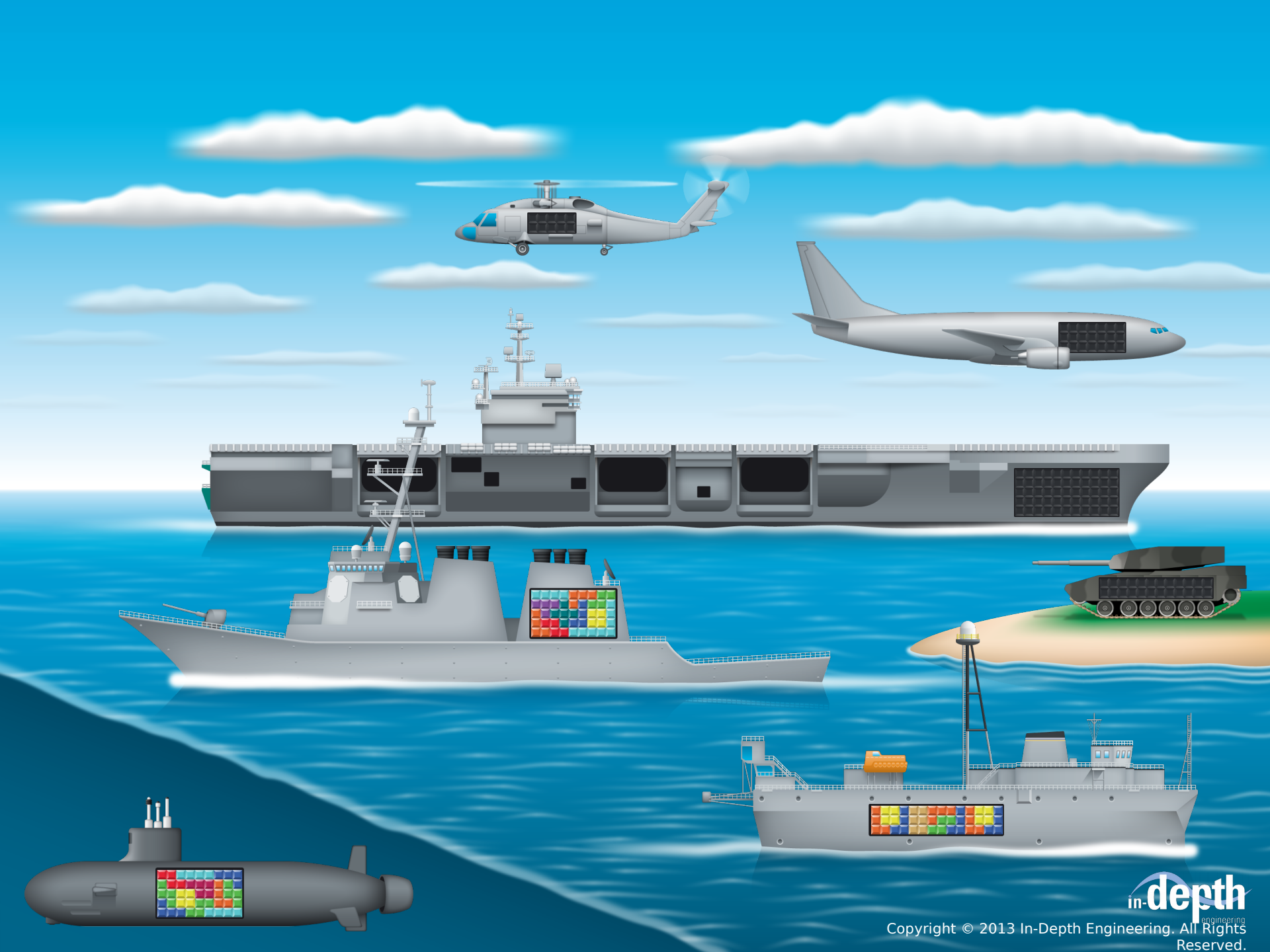

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